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7590
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| EXAMINER |
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SUNG, CHRISTINE

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| ART UNIT | PAPER NUMBER |
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2884

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

09/914,928

Applicant(s)

VERGER ET AL.

Examiner

Christine Sung

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

1. The amendment filed on December 14, 2006 has been accepted and entered.

Claim Objections

2. Claim 12 is objected to because of the following informalities: Claim 12 contains a spelling error. The claim read “mad” but should read --made--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 17 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding the claims, the specification provides no guidance as to the scope of “a few dm².” Thus the claims are indefinite because the claimed ranges fail to reasonably disclose the metes and bounds of the detector area to one of ordinary skill in the art.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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6. Claims 1-2, 4, 7-10, 13-17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Schieber (US Patent 5,892,227 A).

Regarding claim 1, Schieber discloses an x-ray imagery device (Figure 5) comprising at least one detection matrix, said detection matrix comprising:

An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27); and

A detection layer (figure 5, element HgI_2) made of a continuous layer of semiconducting material (claims 2-5) deposited in vapor phase on the electric charges reading panel (figure 6, semiconducting layer is vapor deposited), the detection layer converting incident x-photons into electric charges (column 4, lines 42-53), each electronic device and a portion of the detection layer formed thereon forming a respective pixel of the detection matrix (claim 10).

Regarding claim 2, Schieber discloses a process for making an x-radiation imagery device (claim 21) comprising at least one detection matrix, said detection matrix comprising

An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27); and

A detection layer (figure 5, element HgI_2) made of a semiconducting material (claims 2-5) converting incident x-photons into electric charges (column 4, lines 42-53), said process comprising:

Forming the electronic devices on the monocrystalline silicon substrate to produce the electric charges reading panel (column 6, lines 16-27); and

Vapor phase depositing the semiconducting material on the electric charges reading panel so as to form the detection layer made of a continuous layer of the semi conducting material (column 11, lines 66- column 12-line 17), thereby forming a matrix of detection pixels (claim 10), each detection pixel including a corresponding electronic device a portion of the detection layer formed thereon.

Regarding claim 4, Schieber discloses that the semiconducting material used to make the matrix of detection pixels is CdTe, HgI₂, or PbI₂ (Claims 3, 2 and 5 respectively).

Regarding claim 7, Schieber discloses that the detection layer is deposited directly on the electronic devices of the electric charges reading panel in each pixel (column 12, lines 30-33).

Regarding claim 8, Schieber discloses that the semiconducting material of the detection layer is crystalline silicon (see figure 5, "Si substrate").

Regarding claim 9, Schieber discloses that the electronic devices comprise at least one of an amplifier, preamplifier, filter or processing circuit (see column 6, lines 26-27).

Regarding claim 10, Schieber discloses that the processing circuit includes a counting circuit (column 7, lines 47-51).

Regarding claim 13, Schieber discloses assembling more than one detection matrix to form a large area digital detector (column 14, lines 22-28).

Regarding claim 14 Schieber discloses an x-radiation imagery device comprising at least one detection matrix, said detection matrix comprising:

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An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27), each electronic device including an amplifier (claim 8);

A detection layer (figure 5, element HgI_2) made of a continuous layer of semiconducting material (claims 2-5) deposited in vapor phase on the electric charges reading panel (figure 6, semiconducting layer is vapor deposited), the detection layer converting incident x-photons into electric charges (column 4, lines 42-53), each electronic device and a portion of the detection layer formed thereon forming a respective pixel of the detection matrix (claim 10).

Regarding claim 15, Schieber discloses that the electronic devices comprise at least one of an amplifier, preamplifier, filter or processing circuit (see column 6, lines 26-27).

Regarding claim 16, Schieber discloses a process for making an x-radiation imagery device (claim 21) comprising at least one detection matrix, said detection matrix comprising

An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27); and

A detection layer (figure 5, element HgI_2) made of a semiconducting material (claims 2-5) converting incident x-photons into electric charges (column 4, lines 42-53), said process comprising:

Forming the electronic devices on the monocrystalline silicon substrate to produce the electric charges reading panel (column 6, lines 16-27) each electronic device including an amplifier (claim 8); and

Vapor phase depositing the semiconducting material on the electric charges reading panel so as to form the detection layer made of a continuous layer of the semi conducting material (column 11, lines 66- column 12-line 17), thereby forming a matrix of detection pixels (claim 10), each detection pixel including a corresponding electronic device and a portion of the detection layer formed thereon.

Regarding claims 17 and 19, Schieber discloses that the device has a detection area of a $10 \times 10 \text{ cm}^2$ to $10 \times 10 \text{ cm}^4$ (claim 6).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3, 12, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schieber (US Patent 5,892,227 A).

Regarding claims 3 and 12, Schieber discloses the limitations set forth in claim 2.

Although Schieber does not explicitly state that the temperature of the deposition process of the semiconducting material be at a temperature that does not damage the electronic device, it would have been obvious to one having ordinary skill in the art to have chosen an appropriate temperature that would not exceed the highest tolerable temperature of the electronic devices, so

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as to not render the device useless. It is well-known in the art, when successively depositing layers of a device, to select a proper temperature and/or order to ensure preceding layers are not destroyed.

Regarding claim 18 and 20, Schieber does not explicitly specify the dimensions of the silicon wafer, however 1- 12 inch diameter wafers (5-30 cm diameter wafers) are well known conventional stock wafers (see pertinent art references). Thus, even though Schieber does not explicitly disclose the wafer dimensions, it would have been obvious to one having ordinary skill in the art to use stock silicon wafers, which have conventional dimensions of 5-30 cm.

9. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schieber (US Patent 5,892,227 A) over the admitted prior art.

Regarding claim 5-6, Schieber discloses that the electronic devices are made using photolithography (column 12, lines 34-43). Schieber does not explicitly state the particular feature sizes, however, applicant discloses that the such feature sizes are conventional (page 7, lines 26-31). Thus, it is obvious to one having ordinary skill in the art to make conventional electronic devices with conventional feature sizes in order to reduce production costs and take advantage of well-known manufacturing techniques.

Response to Arguments

10. Applicant's arguments with respect to claims 1-10, 12-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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- a. Partial Stock List- Silicon Sales- lists conventional stock wafer dimensions
- b. Barber- US Patent 5,245,191- discloses continuous layered semiconductor detector with integrated circuitry.
- c. Iwanczyk- US Patent 7,186,985 B2- discloses continuous semiconductor film detector that is deposited on the readout circuitry.- cannot be applied as prior art.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 9-5 pm.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Christine Sung
Examiner
Art Unit 2884

CS



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